

1.) Electromagnetic actuator for actuating a gas exchange valve (10) having an electromagnet (1) for closing the gas exchange valve (closing magnet) and an electromagnet (2) for opening the gas exchange valve (opening magnet), having a corresponding armature (3) actuating the gas exchange valve (1) and with oppositely directed spring forces (6, 9) acting on the armature (3), which set the armature (3) in an intermediate position between two end positions without actuating an electromagnet (1, 2), wherein the armature (3) is at least kept in the vicinity of the poles (2c) of the electromagnets (1, 2) by means of the electromagnets (1, 2), wherein the armature (3) is pivotably supported around a pivoting axis (4) and wherein the distance l_1 of the actuation point onto the gas exchange valve from the pivoting axis (4) is larger than the distance l_2 of the centre of the armature from the pivoting axis (4) (transmission ratio $i = l_2/l_1 < 1$),

the armature (3) is formed in such a way, that the centre (middle 3b) of the armature portion arranged opposite to the opening magnet (2), lies closer to the pivoting axis (4) than the centre (middle 3a) of the armature portion arranged to the closing magnet (1) and that the poles (1c, 2c) of the electromagnets (1, 2) are arranged to lie opposite to these armature portions.

- 2.) Electromagnetic actuator according to claim 1,
characterised in that
at least one of the armature portions is formed as an immersion armature with
immersing armature portions (13a, 13b).

- 3.) Electromagnetic actuator according to claim 1 or 2,

characterised in that

the armature portion arranged to the opening magnet (12) is formed as an immersion armature (13a, 13b) and that the armature portions (13a, 13b) immersing in the electromagnets (12) lie closer to the pivoting axis (4) than

these immersing armature portions (13a, 13b).

4.) Electromagnetic actuator according to one of the claims 1 to 3,
characterised in that
a flat armature (3) is arranged to the closing magnet (1) or in that the closing magnet (1) comprises a flat armature.

5.) Electromagnetic actuator according to one of the claims 1 to 4,
characterised in that
at least one rolling member bearing (15) is provided for the pivotable support.

6.) Electromagnetic actuator according to one of claims 1 to 5,
characterised in that
the armature (3) and/or the yokes (1a, 2a) are formed from stamped parts.

7.) Electromagnetic actuator according to one of claims 1 to 6,
characterised in that
the yokes (1a, 2a) are adjustable relative to the armature (3).

8.) Electromagnetic actuator according to one of claims 1 to 7,
characterised in that

- 4.) Electromagnetic actuator according to one of the claims 1 to 3,
characterised in that

a flat armature (3) is arranged to the closing magnet (1) or in that the closing magnet (1) comprises a flat armature.
- 5.) Electromagnetic actuator according to one of the claims 1 to 4,
characterised in that

at least one rolling member bearing (15) is provided for the pivotable support.
- 6.) Electromagnetic actuator according to one of claims 1 to 5,
characterised in that

the armature (3) and/or the yokes (1a, 2a) are formed from stamped parts.
- 7.) Electromagnetic actuator according to one of claims 1 to 6,
characterised in that

the yokes (1a, 2a) are adjustable relative to the armature (3).
- 8.) Electromagnetic actuator according to one of claims 1 to 7,
characterised in that

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the electromagnets (1, 2) have the form of an E or E/U.

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cont 7.)
9.) Electromagnetic actuator according to one of claims 1 to 8,
characterised in that

the electromagnet for opening the gas exchange valve is two-poled.